AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of Claims:

Claim 1 (canceled)

Claim 2 (amended)

Electronic control apparatus as in claim 6, wherein one of the processes operating in one or more processors instantiated in said FPIC acts as a common access point.

Claim 3 (amended)

Control apparatus as in claim 6, wherein said processing elements are represented by specific software and hardware elements operating a plurality of individual processors instantiated in said control apparatus.

Claim 4 (amended)

Control apparatus as in claim 6, wherein said processing elements are represented by specific hardware elements, namely micro-controller architectures, programmable or firmware-controlled State-Machines and Sequencers or combinatorial asynchronous or sequential Boolean logic circuits instantiated in a plurality of interfaced external electronic control apparatus or processors.

Claim 5 (amended)

Control apparatus as in claim 6, wherein said processing elements are represented by software mapped to a single or to multiple instantiated processor architectures [~~instantiated in said FPIC~~], said software operating asynchronously or synchronously in series or in parallel fashion.

Claim 6 (amended)

A distributed control system for controlling a plurality of processes, the system comprising a plurality of local monitoring devices, having: sensors for collecting local data and signals concerning at least one process associated with the monitoring device; a local data processor for receiving and communicating the local data from the sensors concerning its associated process; a centralized data processor coupled to a plurality of local devices that provide means for monitoring, diagnosing, prognosing and controlling; the said centralized data processor providing the means for receiving from each local controlling device the local data concerning its associated process, for generating a set of weighted parameters for each local controlling device, and for communicating the set of weighting parameters to each local controlling device, the local processor for each local controlling device further for receiving the set of weighting parameters and processing the local data using the set of weighted parameters for local diagnostic and control purposes. ~~[and at least one the local controlling devices being one of the electronic control apparatus as in claim 1.]~~

Claim 7 (canceled)

Claim 8 (canceled)

Claim 9 (amended)

The distributed adaptive control system as in claim 6 wherein the direct hardware is chosen from the group consisting of electronic, electro-mechanical, electro-optic or electro-hydraulic control systems.

Claim 10 (canceled)

Claim 11 (canceled)

Claim 12 (canceled)

Claim 13 (canceled)

Claim 14 (canceled)

Claim 15 (canceled)

Claim 16 (canceled)

Claim 17 (canceled)

Claim 18 (amended)

The distributed adaptive control system as in claim 6, wherein the instantiated interconnections provide access to system external units via at least one of a network and wireless connection.

Claim 19 (new)

The distributed adaptive control system as in claim 6 wherein instantiated processing elements assume roles, a first control process represents the specific functionality of system support applications, a second control process covers all applications related with real-time networks and direct hardware controls, a third control process exercises all human interface applications and the electronic control apparatus specific functionalities, a fourth control process functions as a network access point connecting to electronic system external extension units, and a fifth process performs instantiation "on-the-fly".

REMARKS/ARGUMENTS:

In the Non-final Office Action mailed February 3, 2005, claims 1-18 were examined. In the Office Action, the Examiner rejected to, the claims as follows:

- Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 were rejected under U.S.C. 103(a), as allegedly obvious over U.S. Patent No. 6,449,273 to Jennings, III and Earle ("the Jennings Patent") in view of U.S. Patent 6,275,499 to Wynn et al. ("the Wynn Patent").

Note: Claim 6 was annotated by the Examiner, but indicated to be allowable (welcome) if rewritten in an independent form, with an appropriate feedback in this response to the Office Action.

- Claims 11, 12, 13, 14, 15, 16, 17 and 18 were rejected under U.S.C. 102(e), as allegedly being anticipated by U.S. Patent No. 6,292,719 to Staiger ("The Staiger Patent").

Applicant has cancelled claims 1, 5, 8, and 10-17; has amended allowable claim 6 to be in independent form; has amended claims 2, 3, 4, 7, and 9 to depend on allowable claim 6; has amended claim 18 to remove the offending reference to tetrahedral connection; and has added new claim 19 to depend on the allowable claim 6. Accordingly, Applicant respectfully requests the removal of the objections, and traverses the rejection to dependent claim 6.

The Invention

Before addressing the specific claim limitations it will be helpful first to briefly summarize the embodiments of the invention that are covered by the pending claims.

The present invention resides in a new and improved stand-alone, compact, low power instrument that utilizes Multi-Chip Module (MCM) design. The core elements of the present invention include the following: a microprocessor, a static random access memory, a non-volatile memory, a dynamically reconfigurable Field Programmable Gate Array (FPGA), reconfigurable interconnect devices, reconfigurable analog function blocks, and reconfigurable programming.

In a preferred embodiment, the present invention supports the following types of functionality: (1) in-situ instantiation of programming of processor software; (2) in-situ reprogrammation of the FPGA's operational software programs, with adaptive parallel program codes; (3) individualization of the serial codes, embedded descriptions of the design specification, past history, maintenance, etc. utilized in diagnostics and prognostics; (4) storage of confirmation information for setting properties of functional units; and (5) creative power management instantiated as required for discontinuous (going from powered operation to non-powered) operation effected through state preservation and recovery.

The distributed adaptive control system of the present invention offers through instantiation of calculus and algorithms on-the-fly which in turn offers enhanced power management and functional flexibility, more specifically, the device offers variable analog-to-digital conversion bit depths, instantiation of analog circuits, instantiation of connections, instantiation of digital circuits and on-the-fly modification of calculus and algorithm parameters.

The present invention improves upon and teaches new capabilities over the prior art of U.S. Patent No. 6,148,399 to Lyke, U.S. Patent No. 6,199,018 to Quist et al., U.S. Patent No. 5,563,928 to Rostoker et al., U.S. Patent No. 5,678,057 to Rostoker et al., U. S. Patent No. 6,049,748 to Newman et al., U. S. Patent No. 6,449,273 to Jennings, III and Earle, U.S. Patent No. 6,292,718 to Staiger, U.S. Patent No. 6,275,499 to Wynn et al., and other prior art referenced in the patent application or by the Examiner. These improvements and new capabilities include:

a) A combination of analog and digital processing that using instantiation changes, adapts and reconfigures according to programming and controls
b) Instantiation "on-the-fly,"
c) On-the-fly instantiation of devices, algorithms, applications and (analog and digital) processes,
d) Probabilistic Diagnostics and Prognostics For Internal and External Control,
e) Unclocked asynchronous multi-threaded operation,
f) Instantiation (creation) "on-the-fly" of devices,
g) Support for unclocked asynchronous operation at the raw speed of the flow of electricity or light,
h) Use of on-the-fly instantiation of adaptive parallel multi-processing control systems, and
i) Removal of the need for a dedicated microprocessor and dedicated software applications.